Neftyanoe Khozyaystvo - Oil Industry 2015 N10, pages 54-57

Analysis of the 'representative elementary volume' sandstones reservoir properties using the method of X-ray computed tomography in Ashalchinskoye oil field

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Abstract

The study deals with a problem of upscaling data which was obtained from the microscopic study of objects on a macroscopic scale. To investigate this issue we use the concept of 'representative elementary volume' (REV). Methods of REV determining is to calculate the parameters of the physical properties of the sample with successive increase in research and fixing the minimum size at which a further increase in the variation of parameters become insignificant. On the basis of data obtained by using of X-ray microtomography and methods of mathematical modeling, for three samples of sandstones from Ashalchinskoye oil field we calculated REV for porosity, specific surface area and absolute permeability tensor components in the main axes. It is shown that the REV for porosity for three samples lies within a narrow range. A similar result was obtained for the other measured characteristics of the samples. This demonstrates the fidelity of the selected methodology for determining the macroscopic properties.

Keywords

Absolute permeability tensor, Porosity, Representative elementary volume, Specific surface area, X-ray CT